

Wear Performance Improved With Highly Cross-Linked Polyethylene Acetabular Liners

Written by Emma Hitt Nichols, PhD

Acetabular liners made with highly cross-linked polyethylene (XLPE) have greater wear performance and do not cause osteolysis compared with conventional polyethylene (CPE) liners in patients that have undergone total hip arthroplasty (THA). Koji Tsuji, MD, University of Florida, Gainesville, Florida, USA, presented data from a study that evaluated the long-term performance of XLPE acetabular liners in THA.

Osteolysis caused by polyethylene debris is a major complication that can occur following THA. *In vitro* studies of XLPE acetabular liners demonstrated low wear rates. In addition, short-term clinical studies have demonstrated that acetabular liners made of XLPE had better wear performance than CPE liners. The purpose of this study was to determine the long-term wear performance of XLPE versus CPE in patients that had undergone primary THA.

Patients undergoing THA were enrolled between 2003 and 2005. The surgery was performed by a single surgeon using the anterolateral approach and the same liner design was randomly assigned at surgery. The prosthesis used was a cementless cup with a 26-mm cobalt-chromium (CoCr) head. Wear performance was determined by radiography using the Roman assessment method. Assessment included femoral head penetration and supine AP X-p at 3, 6, 9, 12, 18, 24, 36, 48, and 60 months post surgery and at the final follow-up. Femoral head penetration was assessed by measuring the distance between the center of the acetabular head and the center of the acetabular cup as visualized by radiograph.

In the study, 188 hips were replaced with a mean follow-up of 81 to 82 months. The mean patient age was 57 and 61 years in the XLPE and CPE arms, respectively. The mean body weight was 54 kg and the mean body mass index was ~23 kg/m².

XLPE liners demonstrated a better wear performance than the CPE liners. The mean femoral head penetration was greater in the patients who had received the CPE liner compared with those who received the XLPE liner at final follow-up ($p < 0.05$). The total femoral head penetration rate was 0.041 and 0.003 for the CPE and XLPE arms, respectively, resulting in a 92% decrease in the mean penetration rate. There were no reports of osteolysis in the XLPE arm compared with 7.9% of patients experiencing osteolysis in the CPE arm at final follow-up ($p = 0.005$). Osteolysis was observed at ~6 years post surgery at Gruen Zone 1.

Dr. Tsuji indicated that the 92% decrease in the femoral penetration rate observed with XLPE liners is consistent with previous studies that had shown 30% to 90% reductions. Wear rates were not associated with patient demographics. Dr. Tsuji stated that, in his opinion, the data from this study suggest that XLPE liners improve wear performance with less incidence of osteolysis compared with CPE liners in patients that have undergone THA.

Low-Dose Dexamethasone Before TKA Reduces Postoperative Nausea, Vomiting, and Pain

Written by Nicola Parry

Study data was presented by In Jun Koh, MD, Uijeongbu St. Mary's Hospital, Seoul, Republic of Korea, demonstrating that patients who receive preemptive low-dose dexamethasone prior to total knee arthroplasty (TKA) have a reduced incidence of postoperative pain, nausea, and vomiting [Koh IJ et al. *Clin Orthop Relat Res* 2013].

Although TKA is one of the most effective treatments for advanced knee arthritis, many patients suffer significant pain due to the procedure, as well as postoperative nausea and vomiting (PONV) associated with anesthesia and analgesia. Yet despite the potential clinical benefits of using low-dose dexamethasone to manage these symptoms, there remains little data on its use in this setting. This study therefore set out to compare the preemptive addition of low-dose dexamethasone with a multimodal protocol including the antiemetic ramosetron (Dexa-Ra), with ramosetron alone (Ra). It aimed to determine whether preemptive Dexa-Ra would lead to improved reduction in PONV and additional analgesic effect, and whether dexamethasone increased the risk for wound complications in these patients.

Patients undergoing TKA ($n = 269$) were randomized to Dexa-Ra (dexamethasone 10 mg 1 hour before surgery, and ramosetron immediately post operatively; $n = 135$), or Ra alone ($n = 134$), and were evaluated 0 to 6, 6 to 24, 24 to 48, and 48 to 72 hours after surgery. Symptoms were scored using a 0 to 10 visual analog scale (VAS). At a minimum of 1 year post TKA, patients were also assessed for wound complications and periprosthetic joint infections.

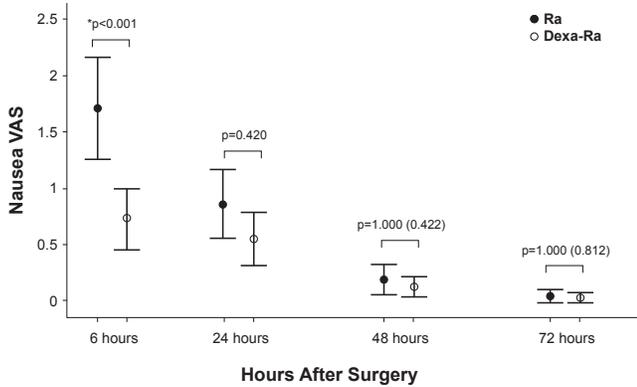
Incidence of PONV was the primary outcome. Secondary outcomes were complete response, pain level, severity of nausea, and incidence of wound complications in addition to use of rescue antiemetics and opioid consumption.

During the 72-hour evaluation period, Dexa-Ra administration was associated with a reduced incidence of postoperative nausea (24% vs 40%; $p = 0.004$), vomiting (7% vs 21%; $p = 0.001$), and use of rescue antiemetics (17% vs 35%; $p = 0.001$), as well as an increased complete response



(76% vs 60%; $p=0.006$), compared with administration of Ra alone. Patients in the Dexa-Ra group also experienced less severe nausea during the first 6 hours (1.6 vs 2.6; $p<0.001$; Figure 1). However, there was no significant difference in the incidence of PONV or nausea between the treatment groups from 6 to 72 hours.

Figure 1. Postoperative Nausea Severity



Dexa-Ra=low-dose dexamethasone with ramosetron; R=ramosetron alone; VAS=visual analog scale.

Reproduced from Koh IJ et al. Preemptive Low-dose Dexamethasone Reduces Postoperative Emesis and Pain After TKA: A Randomized Controlled Study. *Clin Orthop Relat Res.* 2013;471:3010-3020. With permission from Springer.

Dexa-Ra was also associated with less pain (mean VAS pain score 2.4 vs 4.0; $p<0.001$), and opioid consumption (73.5 vs 128.3 μg ; $p<0.001$) from 6 to 24 hours, and reduced overall opioid consumption during the entire 72-hour period (406.2 vs 500.1 μg ; $p=0.004$).

There was no significant difference in wound complications (1.5% vs 2.2%; $p>0.1$) between the groups, and one patient in each group had periprosthetic joint infection (0.7% vs 0.7%; $p>0.1$).

Prof. Koh concluded that the use of dexamethasone in multimodal protocols offers a simple, effective, and inexpensive means of reducing pain and PONV following TKA, without apparent increased risk of wound complications or infection. He stressed, however, that more clinical trial data would be necessary to further evaluate the effect of dexamethasone on wound complications or infection in these patients.

Active Elbow Rotation Delays Healing Time in Radial Head Fractures

Written by Emma Hitt Nichols, PhD

Active elbow rotation within the first 2 weeks after radial head fracture resulted in delayed healing and increased pain compared with restricted elbow use. Nikolaos K. Paschos, MD, University of California, Davis, Davis, California, USA, presented data from a study that evaluated the effect of active elbow rotation in the treatment of radial head fractures.

A large amount of load is transmitted through the radial head during elbow movement, thus making the radial head an important structure in elbow joint stability. The purpose of this study was to determine the effect of introducing active elbow rotation early in the treatment of radial head fractures.

In the prospective, blinded trial, 300 patients with Mason type I or II radial head fractures were randomly assigned to receive 1 of 2 treatment protocols and followed for 2 years. In all patients, the affected limb was immobilized for the first 48 hours. In the first protocol, patients were then treated by mobilization of the affected limb via active flexion and extension of the elbow joint; active pronation and supination were not allowed until 15 days post injury. In the second protocol, patients were treated via active flexion and extension, as well as rotation, of the elbow joint. Follow-up was performed by a blinded orthopedic surgeon two times per week for the first 6 weeks, then once per week for the remaining 3 months. Radiographs were taken during Weeks 1, 4, 8, and 12 and then at the end of the first and second years.

Nonunion of the fracture occurred significantly more frequently in patients who were treated with elbow rotation ($n=14$) compared with patients who were not treated with active elbow rotation ($n=2$; $p<0.01$). In addition, patients who were treated with active elbow rotation demonstrated greater deficit in range of motion (10.3 vs 3.2; $p<0.01$) and pain as measured by the Visual Analogue Scale (1.7 vs 0.6; $p<0.05$) compared with patients who were not treated with elbow rotation. Furthermore, the mean time to fracture healing was significantly better in the patients who did not perform active elbow fracture (28.2 days) compared with those patients who did (36.1 days; $p<0.01$). The American Shoulder and Elbow Surgeons-Elbow score, and grip and pinch strength were similar among both groups.

Introducing active elbow rotation shortly after radial head fracture resulted in poorer outcomes. Dr. Paschos suggested that this is likely due to the additional instability caused by the forces transmitted during active elbow rotation, resulting in delayed healing and potential for fragment displacement. Therefore, he noted that active elbow rotation should be restricted for the first 2 weeks following radial head fracture.

Hyaluronic Acid Is No Better Than Placebo in Knee Osteoarthritis

Written by Nicola Parry

Walter van der Weegen, MSc, St. Anna Hospital, Geldrop, The Netherlands, presented results from a double-blind, randomized clinical trial demonstrating that injections of hyaluronic acid (HA) were no more effective than placebo in treating patients with knee osteoarthritis (KOA).